

## Electrolytes Good Conductors

### 239

plates; the connection with the electrolyte was made by two platinum plates, each about two inches long and half an inch wide: nearly the whole of each was immersed, and they were about half an inch apart. When the circuit was completed, and all at the same temperature, there was no current; but the moment the junction of the antimony and bismuth was either heated or cooled, the corresponding thermo current was produced, causing the galvanometer-needle to be permanently deflected, occasionally as much as  $80^{\circ}$ . Even the small difference of temperature occasioned by touching the Seebeck element with the finger, produced a very sensible current through the electrolyte. When in place of the antimony-bismuth combination mere wires of *copper and platinum*, or *iron and platinum* were used, the application of the spirit-lamp to the junction of these metals produced a thermo current which instantly travelled round the circuit.

802. Thus this electrolyte will, as to high conducting power, fully answer the condition required (799). It is so excellent in this respect, that I was able to send the thermo current of a single Seebeck's element across five successive portions connected with each other by platinum plates.

803. *Nitrous acid*.—Yellow anhydrous nitrous acid, made by distilling dry nitrate of lead, being put into a glass tube and included in a circuit with the antimony-bismuth arrangement and the galvanometer, gave no indication of the passage of the thermo current, though the immersed electrodes consisted each of about four inches in length of moderately thick platinum wire, and were not above a quarter of an inch apart.

804. A portion of this acid was mixed with nearly its volume of pure water; the resulting action caused depression of temperature, the evolution of some nitrous gas, the formation of some nitric acid, and a dark green fluid was produced. This was now such an excellent conductor of electricity that almost the feeblest current could pass it. That produced by Seebeck's circle was sensible when only one-eighth of an inch in length of the platinum wires dipped in the acid. When a couple of inches of each electrode was in the fluid, the conduction was

so good that it made very little difference at the galvanometer whether the platinum wires touched each other in the fluid or were a quarter of an inch apart.<sup>1</sup>

<sup>1</sup> De la Rive has pointed out the facility with which an electric current passes between platinum and nitrous acid.—*Annales de Chimie*, 1828, acxxvii. 278.